

- 1. A method for detecting leakage from a disk drive enclosure, comprising:
  2 providing a disk drive enclosure having a lubricating material and a tag material
  3 therein, wherein at least a portion of the lubricating material and the tag material are in the
  4 vapor phase; and
- 5 measuring a concentration of the tag material in the vapor phase.
- 1 2. A method as in claim 1, wherein the tag material comprises a halogenated 2 material.
- 1 3. A method as in claim 2, wherein the halogenated material comprises a halogenated sulfur material.
  - 4. A method as in claim 1, wherein the tag material comprises at least one material selected from the group consisting of  $SF_6$  and  $S_2F_{10}$ .
- 1 5. A method as in claim 1, wherein the tag material comprises  $SF_6$  and  $S_2F_{10}$ .
- 1 6. A method as in claim 4, wherein the lubricating material comprises a perfluoropolyether.
- 7. A method as in claim 1, further comprising determining a leak rate of the lubricating material from the vapor phase concentration of the tag material.
- 8. A method as in claim 1, further comprising determining an amount of lubricating material remaining in the disk drive enclosure using the concentration of the tag material.

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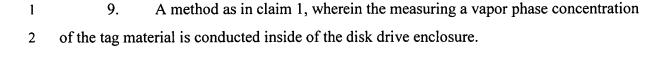
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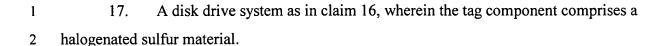
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- 1 10. A method as in claim 9, wherein the measuring is carried out over a period of 2 time at a predetermined interval.
- 1 11. A method as in claim 1, further comprising:
- measuring a concentration of the tag material outside of the enclosure over a time interval and determining a leak rate of the lubricating material from the disk drive enclosure.
  - 12. A method as in claim 11, further comprising determining a quantity of the lubricating material remaining in the disk drive enclosure.
  - 13. A method as in claim 1, further comprising measuring a concentration of the tag material outside of the disk drive enclosure over a period of time and determining a leak rate of the lubricating material from the disk drive enclosure.
  - 14. A method as in claim 13, further comprising determining a quantity of the lubricating material remaining in the disk drive enclosure after the period of time.
  - 15. A method as in claim 1, wherein the tag material has a volatility that is greater than that of the lubricating material.
- 1 16. A disk drive system comprising:
- 2 at least one disk adapted to store data;
- at least one transducer adapted to read and write data to and from the disk; and
- a lubricant composition comprising a lubricant component adapted to lubricate the
- 5 disk surface and a tag component, wherein the tag component has a volatility that enables
- 6 the tag to be detected in the vapor phase.

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- 1 18. A disk drive system as in claim 16, wherein the tag component comprises at least one material selected from the group consisting of SF<sub>6</sub> and S<sub>2</sub>F<sub>10</sub>.
- 1 19. A disk drive system as in claim 16, wherein the tag component comprises  $SF_6$  2 and  $S_2F_{10}$ .
- 1 20. A disk drive system as in claim 18, wherein the lubricating component 2 comprises a perfluoropolyether.
  - 21. A disk drive system as in claim 16, wherein the tag component volatility is greater than that of the lubricant.
  - 22. A disk drive system comprising:
- 2 at least one disk adapted to store data;
- at least one transducer adapted to read and write data to and from the disk;
- 4 a first source of a volatile lubricant; and
- 5 a second source of a tag component incorporated into a substantially non-volatile
- 6 material, wherein the tag component has a volatility that enables the tag component to be
- 7 detected in the vapor phase.
- 1 23. A disk drive system as in claim 22, wherein the volatile lubricant includes a
- 2 perfluoropolyether material and the tag component comprises a halogenated sulfur material
- 3 that is incorporated into a hydrocarbon oil.

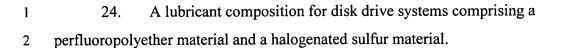
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- 1 25. A lubricant composition for disk drive systems comprising a lubricant 2 material and a tag material, wherein the tag material can be detected in the vapor phase.
- 1 26. A lubricant composition as in claim 25, wherein the tag material comprises a 2 halogenated sulfur molecule.
- 1 27. A lubricant composition as in claim 25, wherein the tag material comprises at least one material selected from the group consisting of  $SF_6$  and  $S_2F_{10}$ .
  - 28. A lubricant composition as in claim 27, wherein the lubricant material comprises a perfluoropolyether.
  - 29. A lubricant composition as in claim 27, wherein the lubricant material comprises a material selected from the group consisting of alcohols, hydrocarbon esters, stearic acid, palmitic acid, other carboxylic acids
- 30. A lubricant composition as in claim 27, wherein the lubricant material comprises a material selected from the group consisting of a perfluoropolyether or a volatile hydrocarbon compounds of the variety used in formulating greases.
  - 31. A computer system comprising:
- 2 a disk drive including a disk drive enclosure;
- a disk drive lubricant composition including a lubricant component and a tag
- 4 component; and
- a sensor adapted to detect a quantity of the tag component in the vapor phase.

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- A computer system as in claim 31, wherein the sensor is positioned outside 1 32. 2 the disk drive enclosure.
- 33. A computer system as in claim 31, wherein the sensor is positioned inside the 1 2 disk drive enclosure.
- 34. A computer as in claim 31, where the computer includes a computer program that is capable of causing the computer system to measure the concentration of the tag 2 3 component in the vapor phase at a predetermined time interval.
  - A computer as in claim 31, wherein the computer includes a computer 35. program that is capable of causing the computer system to measure the concentration of the tag component and determine at least one of a leak rate of the lubricant material from the disk drive assembly and an amount of the lubricant material in the disk drive assembly.
  - A computer as in claim 31, wherein the tag component has a volatility that is 36. greater than that of the lubricant.
- A computer as in claim 31, further comprising a lubricant component source 37. 1 and a target component source, wherein the lubricant component source is separate from the 2 3 tag component source.
- A computer as in claim 31, further comprising a source that contains both the 1 38. 2 lubricant component and the tag component.